

REMARKS

Applicants affirm provisional election without traverse of Group II, claims 12-36. Claims 1-11, which were withdrawn from consideration by the Examiner, have been cancelled without prejudice. New claims 37-47 have been added. Claims 12-47 are pending.

Rejections under 35 U.S.C. § 102(e)

Claims 12-16, 19-29, and 34-36 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Kanaya et al., US 6,217,158 B1 ("Kanaya"). See page 3 of the Office Action. Claims 12 and 19 are independent.

Independent claim 12 and dependent claims

Applicants have discovered a method of depositing ink that includes delivering ink to an ink chamber and applying a jetting voltage across a first electrode and a second electrode on a face of a stiffened piezoelectric element to subject ink within the chamber to a jetting pressure, thereby depositing ink from an exit orifice of the ink chamber. See independent claim 12. For reference, Applicants' Figure 3 is reproduced here:

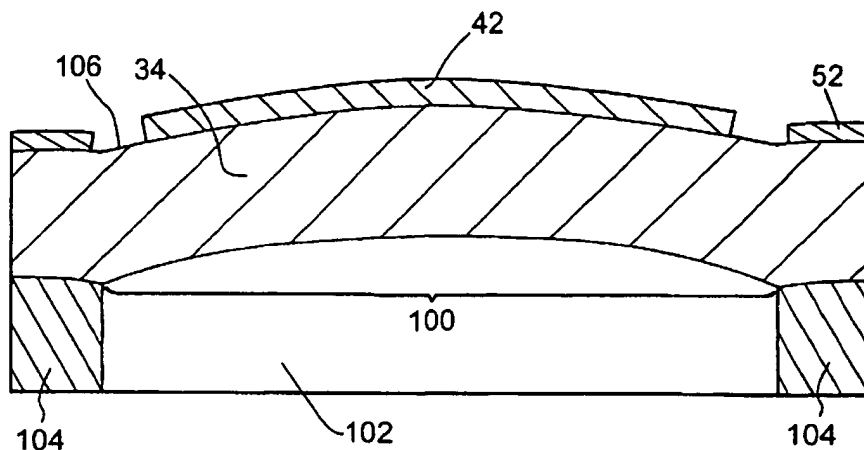


FIGURE 3

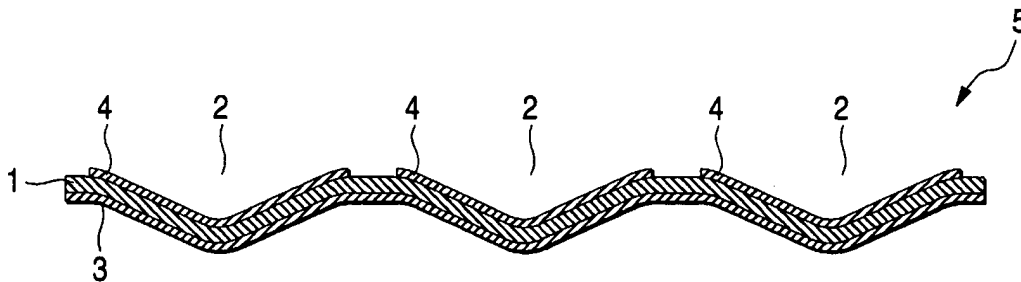
The specification states at page 5, lines 11-14: "Electrodes 42 and 52 are on surface 106 of the piezoelectric element 34. By applying a jetting voltage across the electrodes, ink within

the chamber is subjected to a jetting pressure, which deposits ink from an exit orifice of the ink chamber."

The Examiner contends that Kanaya discloses:

*applying a jetting voltage across a first electrode/discrete electrodes, 4/ and a second electrode/discrete electrodes, 4/(also see fig 1a, 1b) on a face of a stiffened/curved/ piezoelectric element/vibrator unit/ to subject ink within the chamber to a jetting pressure, thereby depositing ink from an exit orifice (36 of fig 8a & 8b) of the ink chamber 23 of fig 8a & 8b) (col 4, lines 10-18, col 7, lines 27-40, 55-62, figs 6a & 6b)

See Office Action at pages 3-4. Applicants respectfully disagree. Kanaya does not disclose a method of depositing ink that includes **applying a jetting voltage across a first electrode and a second electrode on a face of a stiffened piezoelectric element**. The Examiner asserts that Kanaya describes applying a jetting voltage across two discrete electrodes. However, Kanaya describes applying a voltage between electrodes on opposite faces of a piezoelectric element. Nowhere does Kanaya describe applying a voltage between discrete electrodes.



Kanaya, FIG. 1(a)

Kanaya states that "a drive voltage is applied between the common electrodes 3 and at least one of the discrete electrodes 4." See Kanaya at column 4, lines 21-23, and at FIG. 1(a), which is reproduced above. Kanaya further describes that "common electrode 3 is layered over one side of the elastic plate 1... [d]iscrete electrodes 4 are layered on the other side of the elastic plate 1..." See Kanaya at column 4, lines 8-15 (emphasis added). Kanaya does not disclose

applying a jetting voltage across a first electrode and a second electrode on a face of a stiffened piezoelectric element. Therefore, Kanaya does not anticipate the method of claim 12, nor the claims that depend from it.

Independent claim 19 and dependent claims

Applicants have discovered an ink jet printing module that includes an ink chamber, a **stiffened piezoelectric element having a region exposed to the ink chamber**, the piezoelectric element being positioned over the ink chamber to subject ink within the chamber to jetting pressure, and **electrical contacts arranged on a single surface of the piezoelectric element for activation of the piezoelectric element**. See independent claim 19.

The Examiner states that Kanaya discloses:

*electrical contacts/electrodes, 4/ arranged on a surface of the piezoelectric element/vibrator unit/ for activation of the piezoelectric element (col 4, lines 10-18, col 7, lines 27-40, 55-62, figs 1a, 6a, 6b, 8a, 8b, & 13).

See Office Action at page 5. Applicants respectfully disagree. Kanaya describes electrodes on two surfaces of a piezoelectric element. According to Kanaya, the piezoelectric element is activated by applying a voltage between electrodes on opposite surfaces of the piezoelectric element. The discrete electrodes 4 described by Kanaya are not arranged on a surface of the piezoelectric element for activation of the piezoelectric element. As discussed above, "common electrode 3 is layered over one side of the elastic plate 1... [d]iscrete electrodes 4 are layered on the other side of the elastic plate 1...." See Kanaya at column 4, lines 8-15 (emphasis added). Furthermore, "a drive voltage is applied between the common electrodes 3 and at least one of the discrete electrodes 4." See Kanaya at column 4, lines 21-23, and at FIG. 1(a) (reproduced above). Kanaya's discrete electrodes 4 are not arranged for activation of a piezoelectric element. Moreover, Kanaya's common electrodes 3 and discrete electrodes 4 are not arranged on a single surface of a piezoelectric element. Thus, Kanaya does not disclose **electrical contacts arranged on a single surface of a piezoelectric element for activation of the piezoelectric element**. For at least this reason, Kanaya does not anticipate claim 19 nor the claims that depend from it.

Applicants respectfully request reconsideration and withdrawal of rejections under 35 U.S.C. § 102(e).

Rejections under 35 U.S.C. § 103(a)

Claims 17 and 30-33 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanaya in view of U.S. Patent No. 4,700,203 to Yamamuro et al. ("Yamamuro"). See Office Action at page 8. Claim 17 depends from independent claim 12. Claims 30-33 depend from independent claim 19.

Applicants have discovered a method of depositing ink that includes delivering ink to an ink chamber, and applying a jetting voltage across **a first electrode and a second electrode on a face of a stiffened piezoelectric element** to subject ink within the chamber to a jetting pressure, thereby depositing ink from an exit orifice of the ink chamber. Applicants have also discovered an ink jet printing module that includes an ink chamber, **a stiffened piezoelectric element having a region exposed to the ink chamber**, the piezoelectric element being positioned over the ink chamber to subject ink within the chamber to jetting pressure, and **electrical contacts arranged on a single surface of the piezoelectric element for activation of the piezoelectric element**. See independent claims 12 and 19.

As discussed above, Kanaya does not describe a method of depositing ink that includes applying a jetting voltage across **a first electrode and a second electrode on a face of a stiffened piezoelectric element**. Nor does Kanaya describe an ink jet printing module that includes **electrical contacts arranged on a single surface of the piezoelectric element for activation of the piezoelectric element**. Kanaya does not suggest a method of depositing ink that includes applying a jetting voltage across **a first electrode and a second electrode on a face of a stiffened piezoelectric element** or an ink jet printing module that includes **electrical contacts arranged on a single surface of the piezoelectric element for activation of the piezoelectric element**. Indeed, Kanaya only describes electrodes on opposite faces of a piezoelectric element. Yamamuro does not cure these deficiencies. Yamamuro does not describe or suggest a method of depositing ink that includes applying a jetting voltage across a first electrode and a second electrode on a face of a stiffened piezoelectric element, or an ink jet printing module that includes electrical contacts arranged on a single surface of the piezoelectric

element for activation of the piezoelectric element. Yamamuro describes an ink jet head including a film of polyvinylidene difluoride with conductive layers on opposite faces of the film. See Yamamuro at FIG. 14B and column 8, lines 6-39. Furthermore, there is no motivation to combine Kanaya and Yamamuro. Claims 17 and 30-33 are therefore patentable over Kanaya in view of Yamamuro.

Claim 18 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Kanaya in view of U.S. Patent 6,361,154 B1 to Watanabe et al. ("Watanabe"). Claim 18 depends from independent claim 12. As discussed above, Kanaya does not describe or suggest a method of depositing ink that includes delivering ink to an ink chamber, and applying a jetting voltage across **a first electrode and a second electrode on a face of a stiffened piezoelectric element** to subject ink within the chamber to a jetting pressure, thereby depositing ink from an exit orifice of the ink chamber. Watanabe does not cure this deficiency. Watanabe describes an ink jet head body including plural pressure chamber concaves. See Watanabe at Abstract. Watanabe does not describe or suggest a method of depositing ink that includes applying a jetting voltage across a first electrode and a second electrode on a face of a stiffened piezoelectric element, or an ink jet printing module that includes electrical contacts arranged on a single surface of the piezoelectric element for activation of the piezoelectric element. Furthermore, there is no motivation to combine Kanaya and Watanabe. Claim 18 is therefore patentable over Kanaya in view of Watanabe.

Applicants respectfully request reconsideration and withdrawal of rejections under 35 U.S.C. § 103(a).

New claims 37 - 47

Applicants have added new claims 37-47. Independent claim 37 is directed to a method of depositing ink that includes delivering ink to an ink chamber and applying a jetting voltage across a first electrode and a second electrode on a face of a stiffened piezoelectric element to subject ink within the chamber to a jetting pressure, thereby depositing ink from an exit orifice of the ink chamber, wherein the stiffened piezoelectric element has a region spanning the ink chamber and being substantially completely exposed to the ink chamber, the exposed region having a curved surface over the ink chamber, the curved surface being concave relative to the

ink chamber. Independent claim 41 recites an ink jet printing module that includes an ink chamber, a stiffened piezoelectric element having a region spanning the ink chamber and being substantially completely exposed to the ink chamber, the piezoelectric element being positioned over the ink chamber to subject ink within the chamber to jetting pressure, wherein the region of the stiffened piezoelectric element exposed to the ink chamber has a curved surface that is concave relative to the ink chamber, and electrical contacts arranged on a surface of the piezoelectric element distal to the ink chamber for activation of the piezoelectric element. None of the cited references disclose, teach, or suggest the method of claim 37 and or the ink jet printing module of claim 41. Independent claims 37 and 41 and claims that depend therefrom are patentable over the cited references.

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CONCLUSION

Applicants ask that all claims be allowed.